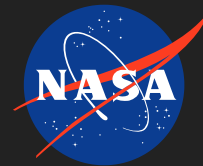


# A New Experiment for Determining Evaporation and Condensation Coefficients of Cryogenic Propellants and Development of an Efficient Computational Model of Cryogenic Film Stability in

## Microgravity

Completed Technology Project (2013 - 2017)



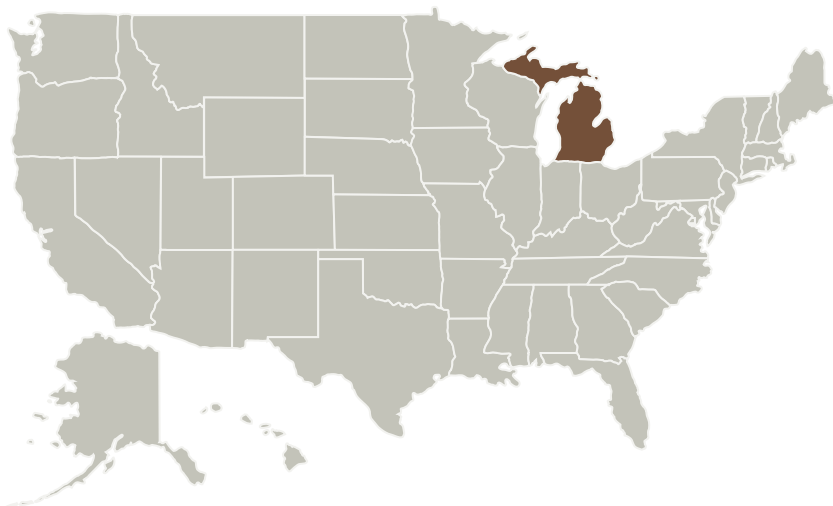
### Project Introduction

Cryogenic propellants (liquid hydrogen and methane) are critical to the long-term U.S. strategy for space exploration and utilization. Unfortunately, designing and simulating cryogenic propellant storage systems for space suffer from an absence of fundamental knowledge and data needed to model evaporation and condensation. Researchers from Michigan Technological University, University of Washington and NASA are developing a new experimental method to obtain this data using the BT-2 Neutron Imaging Facility at NIST. In addition, these researchers are developing a novel, computationally efficient and accurate tool for predicting local thermodynamic conditions and dynamics of cryogenic surfaces in space.

### Anticipated Benefits

This project aims to provide fundamental knowledge and data needed to model evaporation and condensation for development of critical cryogenic propellant storage systems.

### Primary U.S. Work Locations and Key Partners



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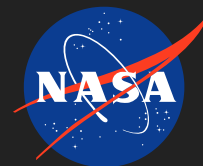
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Organizations Performing Work	Role	Type	Location
Michigan Technological University(MTU)	Lead Organization	Academia	Houghton, Michigan

### Primary U.S. Work Locations

Michigan

### Project Website:

<https://www.nasa.gov/directorates/spacetech/home/index.html>

## Organizational Responsibility

### Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

### Lead Organization:

Michigan Technological University (MTU)

### Responsible Program:

Space Technology Research Grants

## Project Management

### Program Director:

Claudia M Meyer

### Program Manager:

Hung D Nguyen

### Principal Investigator:

Jeffrey M Allen

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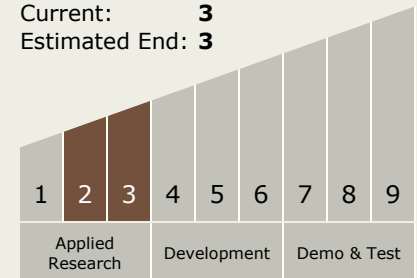
## Microgravity

Completed Technology Project (2013 - 2017)



### Technology Maturity (TRL)

Start: **2**  
Current: **3**  
Estimated End: **3**



### Technology Areas

#### Primary:

- TX05 Communications, Navigation, and Orbital Debris Tracking and Characterization Systems
  - └ TX05.1 Optical Communications
    - └ TX05.1.7 Innovative Signal Modulations

### Target Destinations

Mars, Others Inside the Solar System, Foundational Knowledge